

Claims

WHAT IS CLAIMED IS:

1. An apparatus for multi-modal communication comprising:
 - a controller; and
 - 5 at least one multi-modal session proxy server having a proxy address, wherein the controller determines, on a per session basis, a multi-modal proxy identifier representing the proxy address of the multi-modal session proxy server.
- 10 2. The apparatus of claim 1 further comprising:
 - at least one browser having a per session multi-modal proxy evaluator and a browser proxy identifier, wherein the browser is operably coupled to the controller and the at least one multi-modal session proxy server such that the browser receives the multi-modal proxy identifier and the browser proxy identifier is evaluated by the multi-modal proxy evaluator, on a per session basis, in response to the multi-modal proxy identifier.
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- 20 3. The apparatus of claim 1 further comprising:
 - at least one voice browser having a voice browser per session multi-modal proxy evaluator and a voice browser proxy identifier, wherein the voice browser is operably coupled to the controller and the at least one multi-modal session proxy

server such that the voice browser receives the multi-modal proxy identifier and the voice browser proxy identifier is evaluated by the voice browser per session multi-modal proxy evaluator, on a per session basis, in response to the multi-modal proxy identifier; and

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at least one graphical browser having a graphical browser per session multi-modal proxy evaluator and a graphical browser proxy identifier, wherein the graphical browser is operably coupled to the controller and the at least one multi-modal session proxy server such that the graphical browser receives the multi-modal proxy identifier and the graphical browser proxy identifier is evaluated by the graphical browser per session multi-modal proxy evaluator, on a per session basis, in response to the multi-modal proxy identifier.

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4. The apparatus of claim 3 further comprising:

at least one graphical browser multi-modal synchronization interface operably coupled to the graphical browser;

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at least one voice browser multi-modal synchronization interface operably coupled to at least one the voice browser; and

at least one multi-modal synchronization coordinator operably coupled to the graphical browser multi-modal

synchronization interface, the voice browser multi-modal synchronization interface and the multi-modal session proxy, wherein multi-modal session proxy server allows the multi-modal synchronization coordinator to synchronize the at least one graphical browser and the at least one voice browser.

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5. The apparatus of claim 4 further comprising:

at least one information request provided by at least one of the at 10 least graphical browser and the at least one voice browser to the multi-modal session proxy server whereby the multi-modal session proxy server fetches requested information from a content server; and

wherein if the requested information is provided to the at least one voice browser, the at least one graphical browser is updated via the at least one graphical browser multi-modal synchronization interface through the multi-modal synchronization coordinator and if the requested information is provided to the at least one graphical browser, the at least 15 one voice browser is updated via the voice browser multi-modal synchronization interface through the multi-modal synchronization coordinator.

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6. The apparatus of claim 1 wherein the controller further comprises at least one load balancer, whereupon the controller determines the multi-modal proxy identifier in response to the at least one load balancer.

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7. A system for multi-modal communication comprising:

a terminal that includes at least:

at least one graphical browser with a graphical browser per

session multi-modal proxy evaluator, wherein the at

5 at least one graphical browser dynamically evaluates, on

a per session basis, a graphical browser proxy

identifier; and

at least one graphical browser multi-modal synchronization

10 interface operably coupled to the at least one graphical

browser.

8. The system of claim 7 wherein the terminal further comprises:

an audio subsystem comprising a microphone for receiving an

audio input and a speaker for providing an audio output;

15 a terminal voice transfer interface operably coupled to the audio

subsystem; and

a terminal session control for initiating a wireless terminal session.

9. The system of claim 8 further comprising:

20 a network element including:

at least one voice browser with a voice browser per session

multi-modal proxy evaluator, wherein the at least one

voice browser dynamically evaluates, on a per session basis a voice browser proxy identifier; and at least one voice browser multi-modal synchronization interface operably coupled to the at least one voice browser.

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10. The system of claim 9 wherein the network element includes: a network session control for receiving initialization commands from the terminal session control; a network voice transfer interface for transmitting and receiving encoded audio information from the terminal voice transfer interface; and a speech engine operably coupled to the network voice transfer interface, wherein when a voice command is provided from the terminal voice transfer interface, the speech engine decodes the voice command for the voice browser.

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11. The system of claim 10 wherein the network element further includes:

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a controller; and at least one multi-modal session proxy server having a proxy address operably coupled to the at least one voice browser and the at least one graphical browser, wherein the

controller determines, on a per session basis, a multi-modal proxy identifier representing the proxy address of the multi-modal session proxy server and the multi-modal proxy identifier is provided to the at least one voice browser and

5 the at least one graphical browser.

12. The system of claim 11 further comprising:

a multi-modal synchronization coordinator;

at least one information request provided by at least one of the at

10 least one graphical browser and the at least one voice

browser to the multi-modal session proxy server whereby the

multi-modal session proxy server fetches requested

information; and

wherein if the requested information is provided to the at least one

15 voice browser, the at least one graphical browser is updated

via the at least one graphical browser multi-modal

synchronization interface through the multi-modal

synchronization coordinator and if the requested information

is provided to the at least one graphical browser, the at least

20 one voice browser is updated via the at least one voice

browser multi-modal synchronization interface through the

multi-modal synchronization coordinator.

13. The system of claim 11 further comprising:

at least one content server operably coupled to the multi-modal session proxy server of the network element whereupon when an information request is provided to the multi-modal session proxy server, the multi-modal session proxy server retrieves the requested information from the at least one content server.

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14. The system of claim 11 wherein the controller of the network

10 element further comprises:

a load balancer operably coupled to the controller wherein the load balancer provides an indication of the available bandwidth of the at least one multi-modal proxy server to the controller such that the controller can determine, on a per session basis, the multi-modal session proxy identifier.

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15. An apparatus for multi-modal communication comprising:
a first browser with a per session multi-modal proxy evaluator and
a first browser proxy identifier, the first browser operably
coupled to a first browser multi-modal synchronization
interface;

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at least one second browser with a per session multi-modal proxy
evaluator and a second browser proxy identifier, the at least
one second browser operably coupled to a second browser
multi-modal synchronization interface;

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a multi-modal synchronization coordinator operably coupled to the
first browser multi-modal synchronization interface and the
second browser multi-modal synchronization interface,
whereupon the multi-modal synchronization coordinator
synchronizes the first browser and the at least one second
browser during a multi-modal session; and

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at least one multi-modal session proxy server having a proxy
address, the multi-modal session proxy server operably
coupled to the first browser, the at least one second browser
and the multi-modal synchronization coordinator, wherein
the first browser dynamically updates the first browser proxy
identifier on a per session basis and the second browser
dynamically updates the second browser proxy identifier on
a per session basis.

16. The apparatus of claim 15 further comprising:
a controller operably coupled to the multi-modal session proxy
server, wherein the controller determines, on a per session
basis, a multi-modal proxy identifier representing the proxy
address and provides the multi-modal proxy identifier to the
first browser and the at least one second browser.

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17. The apparatus of claim 16 further comprising:
at least one information request provided by at least one of the first
browser and the at least one second browser to the multi-
modal session proxy server whereby the multi-modal session
proxy fetches requested information from a content server;
and
wherein if the requested information is provided to the at least one
second browser, the first browser is updated via the first
10 browser multi-modal synchronization interface through the
multi-modal synchronization coordinator and if the
requested information is provided to the first browser, the at
least one second browser is updated via the second browser
multi-modal synchronization interface through the multi-
modal synchronization coordinator.

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18. The apparatus of claim 17 wherein the first browser is a
graphical browser and the at least one second browser is a voice browser.

19. A method for multi-modal communication comprising:
receiving a multi-modal proxy identifier, on a per session basis, for
a browser;
evaluating, on a per session basis, a browser proxy identifier in
5 response to receiving the multi-modal proxy identifier; and
sending an information request via a multi-modal session proxy
server identified by the multi-modal proxy identifier.

20. The method of claim 19 further comprising:
10 fetching requested information from at least one content server;
and
providing the requested information to the browser.

21. The method of claim 20 further comprising:
15 prior to sending an information request, storing an updated
browser proxy identifier in a memory location.

22. A method for multi-modal communication comprising:
receiving a multi-modal proxy identifier, on a per session basis, for
a graphical browser;
evaluating, on a per session basis, a graphical browser proxy
5 identifier in response to receiving the multi-modal proxy
identifier
receiving the multi-modal proxy identifier, on a per session basis,
for a voice browser;
evaluating, on a per session basis, a voice browser proxy identifier
10 in response to receiving the multi-modal proxy identifier
sending an information request from at least one of the graphical
browser or voice browser via a multi-modal session proxy
server identified by the multi-modal proxy identifier.

15 23. The method of claim 22 further comprising:
prior to receiving a multi-modal proxy identifier, initiating a multi-
modal session between a terminal and a multi-modal
network element and determining the multi-modal session
proxy server on a per session basis.

20 24. The method of claim 23 wherein the graphical browser is
disposed on the terminal and the voice browser is disposed on the
network element.

25. The method of claim 24, prior to sending an information request, further comprising:

storing an updated graphical browser proxy identifier in a

5 graphical browser memory location; and

storing an updated voice browser proxy identifier in a voice browser memory location.

26. A method for multi-modal communication comprising:
determining a multi-modal session proxy server, on a per session
basis; and
providing, on a per session basis, a multi-modal proxy identifier to
5 a browser.

27. The method of claim 26, the step of determining a multi-modal
session proxy server, on a per session basis, further comprising:
accessing a load balancer, wherein the load balancer is operably
10 coupled to a controller; and
determining the multi-modal session proxy server in response to
the load balancer.

28. The method of claim 26 further comprising:
15 prior to determining a multi-modal session proxy server, on a per
session basis, initiating a multi-modal session between a
terminal and a multi-modal network element.

29. The method of claim 28 further comprising:
20 evaluating, on a per session basis, a browser proxy identifier in
response to receiving the multi-modal proxy identifier; and

receiving an information request from the browser to the multi-modal session proxy server identified by the multi-modal proxy identifier.

5 30. The method of claim 28 further comprising:
fetching requested information from a content server; and
providing the requested information to the browser.

31. A method for multi-modal communication comprising:
generating a multi-modal proxy identifier and a multi-modal
session identifier;
providing the multi-modal proxy identifier and the multi-modal
5 session identifier to a first multi-modal browser and at least
one second multi-modal browser;
sending an information fetch request for requested information
from the first multi-modal browser, the information fetch
request having the multi-modal session identifier, to a multi-
modal session proxy server identified by the multi-modal
proxy identifier; and
10 fetching the requested information from a content server and
caching the requested information in the multi-modal proxy
server, referencing the requested information by the multi-
modal session identifier.
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32. The method of claim 31 further comprising:
providing the requested information to the first multi-modal
browser;
20 notifying a multi-modal synchronization coordinator of the
successful fetch request; and
notifying the at least one second multi-modal browser of the first
multi-modal browser information fetch request.

33. The method of claim 32 further comprising:
sending a second information fetch request from the at least one
second multi-modal browser to the multi-modal session
proxy identified by the multi-modal proxy identifier, wherein
the fetch request has the multi-modal session identifier.

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34. The method of claim 33 further comprising:
retrieving the requested information from the multi-modal session
proxy server based on the multi-modal session identifier;
10 and
providing the requested information to the at least one second
multi-modal browser.

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